

1972

NARRATIVE REPORT
MARK TWAIN NATIONAL WILDLIFE REFUGE
BRUSSELS DISTRICT
1972

DEPARTMENT OF THE INTERIOR
BUREAU OF SPORT FISHERIES AND WILDLIFE
MARK TWAIN NATIONAL WILDLIFE REFUGE
BRUSSELS, ILLINOIS

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I. GENERALA. WEATHER CONDITIONS

The weather of 1972 can best be described as abominable. It seemed that throughout the year the weather was nearly the opposite of what had been desired and expected. Data collected at the Calhoun Division headquarters station are shown below.

Table 1
Precipitation

<u>Month</u>	<u>Snowfall</u>	<u>This Month</u>	<u>Normal*</u>	<u>Maximum Temp.</u>	<u>Minimum Temp.</u>
January	3.00	0.49	1.98	68	-8
February	Trace	0.61	2.04	85	6
March	----	3.26	3.08	86	18
April	----	5.60	3.71	87	25
May	----	1.28	3.73	98	44
June	----	1.28	4.29	99	43
July	----	2.11	3.30	100	48
August	----	2.78	3.02	101	54
September	----	4.85	2.76	96	40
October	----	2.37	2.86	84	26
November	2.00	5.28	2.57	64	18
December	Trace	3.53	1.97	66	6
TOTALS	5.00	33.44	35.31	101**	-8**

* St. Louis, Missouri Weather Station.

** Extremes for the year.

B. HABITAT CONDITIONS1. WaterBatchtown Division

Data for the Mississippi River in Navigation Pool 25 are shown in Table 2.

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Table 2
Water Elevations 1972

Mississippi River -- Navigation Pool 25
Batchtown Division Pump Station

<u>Month</u>	<u>Average Elevation</u>	<u>Maximum Elevation</u>	<u>Minimum Elevation</u>	<u>Maximum Deviation</u>
January	434.26	434.31	434.21	0.10
February	434.31	434.31	434.31	0.00
March	432.26	433.11	431.31	1.80
April	434.26	434.61	430.81	3.80
May	434.33	435.91*	431.11	4.80
June	431.44	432.11	431.01	1.10
July	434.11	434.11	434.11	0.00
August	432.33	433.91	430.75	3.16
September	433.46	434.11	432.11	2.00
October	433.69	434.41	432.01	2.40
November	433.10	434.25	430.71	3.54
December	433.97	434.21	433.79	0.42

* High on gauge for the year.

Fluctuations in Navigation Pool 25 were frequent, unannounced, and the product of Corps of Engineer's manipulations. In the face of this activity, gravity management of Middle Pool water levels became impractical and much of the year the pool was not at planned elevations. The Upper and Lower Pools fluctuated with the river throughout the year. Middle Pool water elevations are shown below in Table 3.

Table 3
Water Elevation Data 1972
Batchtown Division -- Middle Pool

<u>Month</u>	<u>Average Elevation</u>	<u>Maximum Elevation</u>	<u>Minimum Elevation</u>	<u>Maximum Deviation</u>	<u>Planned Elevation</u>
January	434.58	434.60	434.56	0.04	434.00
February	434.48	434.48	434.48	0.00	434.00
March	434.39	434.54	434.30	0.24	434.00
April	434.54	434.62	434.32	0.30	434.00
May	435.36	436.10*	434.54	1.56	433.50
June	433.50	434.30	432.86	1.44	433.00
July	432.61	432.80	432.36	0.44	433.00
August	432.39	432.72	431.94	0.78	433.00
September	432.60	433.04	431.96	1.08	433.50
October	433.17	433.54	432.70	0.84	433.50
November	433.72	433.90	433.54	0.36	434.00
December	434.15	434.30	433.92	0.38	434.75**

* Spring flood crest. Water entered Middle Pool upstream from "hinge".

** This elevation was contingent on pump engine installation.

Mid-summer water levels were as much as a foot below planned elevations. This deviation resulted in widespread seeding of cottonwood in the lake floor.

Calhoun Division

Swan Lake rose and fell with the Illinois River, of which it is a backwater. Its levels are tabulated below in Table 4. These data are from the gauge at the Swan Lake pumping station.

Table 4
Water Elevations 1972

Calhoun Division -- Swan Lake

<u>Month</u>	<u>Average Elevation</u>	<u>Maximum Elevation</u>	<u>Minimum Elevation</u>	<u>Maximum Deviation</u>
January	418.94	419.30	418.60	0.70
February	418.85	419.34	418.54	0.80
March	419.34	419.80	418.70	1.10
April	420.37	422.00	419.44	2.56
May	421.42	423.08*	419.10	3.98
June	419.13	419.48	418.90	0.58
July	418.23	419.08	418.60	0.38
August	419.35	420.00	418.80	1.22
September	419.30	419.64	419.06	0.58
October	419.86	420.22	419.36	0.86
November	420.31	420.78	419.36	0.86
December	420.42	422.98**	419.20	3.78

* Spring crest.

** Ice gorge crest.

Two flood crests were experienced on the lake during the year. A spring run-off high occurred in May. This crest overtopped roads and moist soil unit dikes. A major portion of Corps lands was under water at this time. There was no problem of water control after levels fell to near normal. Physical plant damage was slight. The second crest hit in December and was caused by ice gorging in the Illinois River. Water levels rose and fell several times. Again the road and dikes were topped and about 200 acres of standing soybeans and corn were flooded. Again there was little damage to the physical plant, but ice damage to crops was moderately severe.

All water areas were heavily iced most of January and December, but were partly open in February and November.

Moist Soil Units

With the onset of spring migration in late February these units were opened to the river and allowed to rise and fall with it.

Water levels in the units fluctuated from fully flooded by high water to scattered puddles in low areas. This latter condition was quite attractive to northward bound shorebirds. After the spring high water period, ditches were pumped down, the units dewatered, and dried out. Thorough disking and seeding to buck-wheat followed. The units were held dry into the fall. Ditches were filled by gravity flow from the river. This was followed by an extremely wet fall period and the units were flooded by rainfall and resulting run-off. The only problem involved was holding water off our cooperator's unharvested crops. We were able to do this until the ice gorge flood in December. Even after this, drawdown was completed and most of the crop was harvested after solid freeze-up.

Yorkinut Lake and Duck Pocket

These two small water areas were wet until mid-summer and then dried up by evaporation. Fall rains and run-off rewatered them partially. At no time during the year did they approach normal fullness.

Gilbert Lake Division

Water levels are presented in Table 5.

Table 5
Gilbert Lake Water Levels - 1972

<u>Month</u>	<u>Average Elevation</u>	<u>Maximum Elevation</u>	<u>Minimum Elevation</u>	<u>Maximum Deviation</u>	<u>Planned Elevation</u>
January	420.18	420.22	420.14	0.08	420.00
February	420.14	420.20	420.12	0.08	420.00
March	419.49	419.60	419.28	0.32	419.50
April	420.00	421.50	419.52	1.98	419.00
May	421.68	423.10*	419.58	3.52	418.20
June	419.20	419.40	419.00	0.40	418.20
July	419.15	419.34	412.90	0.44	418.20
August	419.04	419.10	418.90	0.20	418.20
September	419.07	419.10	419.00	0.10	418.70
October	419.58	419.76	419.20	0.56	419.00
November	420.24	420.44	419.90	0.54	419.50
December	420.52	421.20**	420.15	1.05	419.50

* Spring flood crest.

** Ice gorge crest.

Obviously water levels deviated from those planned. It should be recalled that in 1971 this lake was all but completely de-watered to permit earthmoving along its north shoreline. That exposure produced a rank growth of annual vegetation and also resulted in an extensive seeding of cottonwood. While this was suspected, it was not visible until drawdown was completed this year. Last year's herbaceous vegetation was flattened by the spring high water and this stand of cottonwood became suddenly very noticeable after leaves developed. Water levels were adjusted to destroy this encroachment.

The lake was held at full pool until the end of February and was then allowed to fluctuate with the river until after the passage of the spring flood crest; the lake was then drawn down by gravity. After the cottonwood invasion was confirmed, the lake was pumped back up to 419.00 and was held at that level until mid-October. Water was further raised to 419.50 which was the planned winter level. Rainfall and run-off in November (third wettest in the last 40 years) pushed water levels to over 420.00. Ice gorging on the Illinois River in mid-December temporarily took management away; however, with the breakup of the ice jam, water levels were dropped to 420.50, at which level they were held to the end of the year.

2. Food and Cover

Batchtown Division

Upper Pool

There was little production of either food or cover due to water level manipulation by the Corps of Engineers. Waterfowl use was low throughout the year.

Middle Pool

Gravity manipulation in the face of Corps operations left much to be desired in this pool. Food production in rice cutgrass, millet, and smartweed was reasonably good. Actually it was probably better than most years, but the excessive drawdown due to evaporation harmed lotus and reduced submergent production to practically nil. Considerable sagittaria was lost. The lake bed was seeded to cottonwood and will require an almost full pool all

of the coming year. Brood use was well below normal in the summer months. A moderate fish kill occurred in late summer due to reduced cover, excessive heat, and shallow water. However, the pool was well used during the fall period by mallards and pintails after emergent vegetation was flooded.

Lower Pool

This pool, like the Upper, is open to the river and varies in elevation with it. However, in this case, the shorelines tend to be wide and flat. A half foot of water makes a great deal of difference in substrate exposure. This year's river manipulations produced nice shoreline vegetation but eliminated all growth in the upper portions of the pool. The end result was a well vegetated shoreline without water on it. Some of the best brood cover on the division is in this pool but was unused by ducklings due to the absence of water. Fall usage by waterfowl was greatly reduced by a massive drawdown in early November. The pool was nearly dry much of the month. The water surface froze early in December and the pool was unused by ducks.

Upland game habitat was better than in any of the last several years. First, there was only very little flooding on these portions of the refuge. Second, the cropping system on boundary fields was changed to 50 per cent crop and 50 per cent annual weeds and grasses. This usually put the weedy portion of these fields adjacent to timbered edges of the pools and gave a somewhat more desirable edge without loss of waste grain. Both cultivated and weed crops were fair to good in most of these fields. Small animals response to both food and cover was proportional.

Deer habitat was greatly improved simply because floods did not destroy the understory in timbered areas.

Calhoun Division

Swan Lake, again this year, failed to produce lotus stands and submergent beds of three or four years ago. The fast growing alluvial deltas extending into the lake produced sagittaria, millet, rice cutgrass, and some smartweed. These were generally watered by the fall high water levels and were well used by fall migrants. The remainder of the lake was almost barren of waterfowl most of the year.

The moist soil units 1, 3 and 4 were thoroughly disked in July to reduce undesirable plant species. The areas were then seeded to buckwheat and reasonably good results were obtained. Moist soil unit 2, which includes Schoolhouse Lake and marsh, was planted in part to soybeans. Schoolhouse Lake showed a rapid conversion from river bulrush to perennial smartweed. Cocklebur invaded the marsh and the dry lake bed. An invasion of willow, maple and cottonwood along one edge was bulldozed out and Rome disked to further destroy it. These disked areas produced a beautiful stand of annual smartweed. This fact certainly points out a management possibility, but this small marsh area is the only one of its type on the refuge so it will be held flooded in the coming few years to allow time for study and evaluation. Other areas can be used for migrants.

Yorkinut Lake and Dick Pocket produced dense mats of duckweeds, some perennial smartweeds, and a scattering of other herbaceous plants. Yorkinut Lake carried its usual thick stand (lovely when blooming) of hibiscus on the south end of the lake. A thick fringe of buttonbush surrounds both of these areas. At their usual water levels these small ponds provide good to excellent brood habitat, but this year went dry in July. Nothing of any real value was produced by this drying.

Food and cover for upland game continued to be marginal. Small boundary fields were again farmed on a 50 per cent basis with the refuge share being annual weeds and grasses. Production of these was good and with additional food available in waste grain in the cooperator's portion of the field, there was no shortage of food. High water during the fall period moved small game out of the timbered fringes along the lake. An ice storm in December, coupled with opening of the refuge to hunting, rapidly reduced populations.

Understory conditions for big game were normal or somewhat above normal in quality and quantity.

Gilbert Lake Division

This year's water levels were highly productive of waterfowl food and were fair for production of cover. The shallow and more or less exposed west and east mudflats produced their usual mixture of rice cutgrass, millet, smartweed, and other annuals. Higher levels in the main portion of the lake resulted in a partial recovery of lotus, production of modest stands of submergents (naiads, sago, American pondweed, and elodea), apparent destruction of the

cottonwood invasion, and greatly set back the waterdock infestation which has developed under drawdown. Perennial smartweed and river bulrush occupied their usual areas, but did not spread. Buttonbush was flooded to some extent and provided shoreline cover for a few broods of ducklings. This held true for the flooded cottonwood stands too. A heavy mat of water primrose grew in the lake and river intake-outlet ditches.

The food and cover picture for upland game, small animals, furbearers, and big game at Gilbert Lake was the same as on the Calhoun Division.

II. WILDLIFEA. MIGRATORY BIRDS1. WaterfowlBatchtown Division

The division had almost no carry-over of wintering waterfowl. Pools were frozen solidly in January and early February. With thawing, waterfowl use began, but remained low all spring. Mallards peaked in February at 8,000 birds. These migrants were on the area only a few days. A scattering of other species were present. Total duck use for the January-April period was 205,100 use days. Goose use days totalled 7,500 and resulted from a short stay by 750 to 1,000 Canadas.

The summer period was typically dominated by wood duck use, but included a few nesting mallards. May-August duck use days totalled 87,000.

The September-December period showed total duck use of 789,550 days. The peak population during the period occurred late in October when 20,000 mallards were using the division.

Duck use days for the year are tabulated below and compared with totals for the last ten years.

Table 6
Duck Use Days and Peak Numbers
Batchtown Division - 1963-1972

<u>Year</u>	<u>Use Days</u>	<u>Peak Numbers</u>
1972	1,081,590	20,250
1971	2,247,796	42,350
1970	663,215	8,250
1969	1,235,308	23,670
1968	1,829,896	40,750
1967	2,797,063	37,595
1966	1,660,449	35,150
1965	2,607,367	65,975
1964	5,503,448	106,790
1963	1,001,812	35,810
Totals	20,627,944	416,590
10-Year Ave.	2,062,794	41,659

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Coot use on the Batchtown Division totalled 73,855 days during the year.

Calhoun Division

A fair wintering population was present and the January-April period produced 30 whistling swan, 291,240 blue-snow, 3,180 Canada, and 516,450 duck use days.

Excepting May, the summer use was almost exclusively wood duck and mallard use. The total for May-August was 74,510 use days. There was little brood cover available on Swan Lake and few broods were seen.

The September-December period was disappointing. There was little diver use of Swan Lake and widgeon and coot use was very low as compared with a few years ago when submergents were still present in the lake. Blue-snow goose use was up somewhat in spite of few young of the year (less than one per cent). There was very little Canada goose use on Calhoun and this was mostly confined to use of the openings in Swan Lake ice after freeze-up. Blue-snow and mallard use of Calhoun fields was excellent during both early spring and fall periods.

Duck use days for the year are shown below together with those for the previous nine years.

Table 7
Duck Use Days and Peak Numbers
Calhoun Division --- 1963-1972

<u>Year</u>	<u>Use Days</u>	<u>Peak Numbers</u>
1972	2,448,790	50,300
1971	2,046,538	35,600
1970*	1,753,032	53,000
1969*	2,657,390	32,545
1968*	3,330,293	69,615
1967*	3,659,040	49,350
1966*	5,313,462	178,320
1965*	4,576,509	103,580
1964*	8,984,898	202,050
1963*	3,914,351	83,515
Total	38,684,303	857,875
10-Year Average	3,868,430	85,788

* Includes Gilbert Lake Duck Use.

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Goose use for the year is tabulated below in Table 8. The data presented cover both the Calhoun and Gilbert Lake Divisions. These two divisions are separated only by the Illinois River and movement between the two divisions is quite common. This is particularly true of the blue-snow flocks. Canada geese generally remain at Gilbert Lake, but do use Calhoun. The small race of Canadas is generally associated more with the blues-snows than with the larger Canadas. Very few small Canadas were seen this year.

Table 8
Goose Use Days
Calhoun and Gilbert Lake Divisions
1963-1972

Year	Use Days			
	Blue-Snow	Small Canada	Canada	White-Fronted
1972	894,580	-----	159,195	-----
1971	716,850	16,450	147,550	49*
1970	307,096	8,190	99,065	14
1969	408,260	9,660	125,248	105
1968	804,453	1,225	74,886	-----
1967	1,407,884	2,625	119,871	-----
1966	671,930	4,375	65,632	14
1965	972,013	469	118,678	819
1964	872,186	10,080	132,370	672
1963	641,458	2,800	120,481	1,680
Totals	7,696,710	55,874	1,162,976	3,353
10-Year Ave.	769,671	5,587	116,298	335

* Gilbert Lake - all other white-fronted use was Calhoun Division.

Table 9
Goose Peak Number
Calhoun and Gilbert Lake Divisions
1963-1972

Year	Blue-Snow	Peak Numbers		
		Small Canada	Canada	White-Fronted
1972	12,000	---	3,000	--
1971	10,000	300	2,000	7*
1970	10,000	300	2,000	2
1969	10,500	200	1,500	2
1968	18,000	75	1,200	--
1967	13,000	150	2,000	--
1966	12,000	120	900	2
1965	11,150	50	1,200	60
1964	12,000	200	1,500	60
1963	12,000	400	1,000	50
Totals	120,650	1,795	16,300	183
10-Year Ave.	12,065	180	1,630	18

* Gilbert Lake Division - all other white-fronted use on Calhoun Division.

Peak populations were of short duration. The wintering flock of blues and snows was under 4,000 birds most of the time. Wintering Canadas totalled less than 2,000.

Gilbert Lake Division

This division was carrying a population of about 12,000 mallards and 3,000 Canada geese at the beginning of the year. These populations declined with the break-up of ice and the advent of spring migration. Species composition during the period included all the usual flyway species except canvasback. One whistling swan was present in February. Total duck use for the January-April period was 491,700 days. Goose use, both blue-snow and Canada was 123,600.

About 500-750 mallards and 75 to 100 Canadas died of lead poisoning on the lake in January. Lead was apparently picked up on

public shooting areas during a period of thawing in late December and early January.

Waterfowl use for the May-August period totalled 45,145 use days. Brood use was better than in several recent years, but cover was and still is deficient. Wood duck use comprised much of the summer total. Mallards were the only other resident species.

The fall period was a good one for the division. Duck use totalled 742,700 use days. Mallards, as usual, supplied the greatest part of this usage. Goose use for the fall period was 261,090 use days. This total included use by both species of geese. About 1,000 Canadas were wintering at the end of the year.

Total waterfowl use for the year was 1,279,545 days for ducks and for geese was 384,690.

Coot use for the year was light, totalling only 34,335 use days.

Brussels District totals of waterfowl use, including coots, is recapitulated in Table 10 below.

Table 10
Duck, Goose, and Coot Use Days

Brussels District - 1972

<u>Division</u>	<u>Ducks</u>	<u>Geese</u>	<u>Coots</u>
Batchtown	1,081,590	7,500	73,855
Calhoun	2,448,790	669,085	77,935
Gilbert Lake	<u>1,279,545</u>	<u>384,690</u>	<u>34,335</u>
Totals	4,809,925	1,061,275	186,125

2. Other Waterbirds

Among this group of birds there was no discernable deviation from normal numbers on any of the three divisions, nor was there any evidence of stress or disease. There are no heronries in the district, but several are located along the rivers in the general area of the refuge.

3. Shorebirds

There were no unusual sightings. The precise water level control necessary to attract this group of birds is beyond the practical for these refuges so habitat for them is dependent upon the vagaries of rivers and weather. This year there was little suitable habitat and populations were low. Flooding in shoreline timber all but eliminated woodcock use. Even common snipe were uncommon.

4. Gulls and Terns

Several Caspian, Forster's, common, and black terns were noted during the migrational periods. Ring-billed gulls were numerous through the wintering periods. Herring gulls were readily seen but in far fewer numbers than ring-bills. A very few Bonaparte's and Franklin's gulls were present for short periods of time during the fall passage.

5. Doves

Small flocks of doves were present through the winter on each of the divisions. No evidence of any nesting difficulty was noted. Migrational numbers did not appear to be in anyway unusual. A severe ice storm in December did not reduce numbers appreciably if at all. This storm, with very heavy glazing, was not accompanied by extreme cold temperatures and was only of about five days duration.

B. UPLAND GAME BIRDS

Bob-white quail was the only upland game bird present on the division. This species fared well much of the year. Nesting, in the absence of spring flooding, was fairly successful. Conditions during the summer were conducive to survival and going into the fall period, the refuge population seemed to be above normal numbers. This situation continued at Batchtown Division, but high water along the Illinois much of the fall resulted in repeated minor flooding of bob-white habitat on the Calhoun and Gilbert Lake Divisions. The coveys on these divisions were forced to higher ground off refuge. The December ice storm did not seriously affect these quail, but only because it was of short duration. The quantity of ice present had it remained on, would have quickly wiped out most of them over a large area

C. BIG GAME ANIMALS

White-tailed deer are the only big game on these divisions. Their numbers are quite variable. Movement on and off the refuge is frequent. It is doubtful if any single deer remains inside the boundaries for more than a month at a time. Deer are seen at infrequent intervals. Much sign is usually present. The fall period with its intermittent high waters produced a major exodus from the Calhoun and Gilbert Lake Divisions.

D. FUR ANIMALS, PREDATORS, RODENTS, AND OTHER MAMMALS

There were no significant changes in populations of these animals. Weather was no problem for them until the minor flooding of the fall period. This produced some displacement. No data are collected on hunting, but hunters reported fair to good results on squirrel, rabbit, and raccoon hunting. Two recreational trapping permits were issued for the period after the close of the waterfowl hunting season. These two trappers had taken less than two dozen muskrats at the end of the year. The continued failure of lotus in the lakes is obviously holding this species more or less in check. There is growing evidence of the presence of coyotes on the Calhoun Division. Both red and grey foxes were seen several times during the year.

E. HAWKS, EAGLES, OWLS, AND CROWS

No unusual species of hawks were seen or reported during the year. Marsh hawks, during the fall period, seemed to be present in fewer numbers than in recent previous years during the same months. Data are so poor that little more than an impression can be cited for them however. In December a population of 10 to 15 red-tails, mostly immatures, built up in a privately owned patch of second growth timber adjacent to Schoolhouse Lake on the Calhoun Division. This group of birds showed tremendous plumage variation. Their hunting activities were not apparently confined to the immediate perching area, but extended over much of the division. This aggregation of hawks lasted most of the month.

Owls were present in normal numbers if calling can be used for a criteria. This year no short-eared owls were found on the division

The usual northern bald eagle numbers were present in the winter months. At Gilbert Lake eagle numbers approached 50 birds at the

time of the lead poisoning die-off in waterfowl. Eagle picked duck and goose carcasses were found under most trees used by eagles. Many others were scattered about on the ice covering the lake. Fish seemed to be the major food item the remainder of their stay in this area. An immature golden eagle was seen from time to time both spring and fall.

Crows were present on all the divisions at all seasons. No changes in relative abundance was noted. There are lots of them around.

F. RARE AND ENDANGERED SPECIES

These divisions have no species in this category.

No peregrines were seen in 1972.

Three osprey were seen during the year, two on Gilbert Lake and one on Calhoun. All sightings were in October. The timing of these sightings indicates a likelihood of two rather than three birds.

G. OTHER BIRDS

Nothing to report.

H. FISH

Nothing to report.

I. REPTILES

Nothing to report.

J. DISEASE

During the first week of February a die-off of ducks and Canada geese occurred at Gilbert Lake. The loss of birds was placed at 500 to 750 mallards and 75 to 100 Canada geese. Examination of these waterfowl indicated lead poisoning as the cause of death. All gizzards examined contained eroded lead shot. Fluoroscopy examination done by the Illinois Department of Conservation also showed large numbers of lead shot in those birds examined.

Warm temperatures in January opened ice on the public shooting areas adjacent to the refuge and ducks and geese moved onto these areas to feed on an almost unused and very attractive food source. Lead was picked up at this time. Subsequent freezing closed the shallower hunting areas and birds moved back onto the refuge and here the die-off occurred.

Historically several lead poisonings have taken place in this general area. The last of these was reported to have been in the late 1950's. This was not apparently written up in any detail and little is now known about conditions leading to bird losses.

This year several factors can be cited as probable causes. The first of these is a year without a flood and the siltations attending flooding. Secondly, drawdowns on the shooting areas were successful and drought during the summer completely dried the lake beds in the vicinity of blinds. Lead shot from 1970 hunting remained at the surface of the lake bed. Thirdly, drying during the summer firmed the lake bed and shot from the 1971 hunting season also remained above mud into the winter. Thus two years accumulation of lead was readily accessible to birds when thawing occurred in January of 1972 and the attracting aquatics became available without disturbance.

There is a good chance that far more birds were actually lost than those found at Gilbert Lake.

No other diseases were known to have occurred.

III. REFUGE DEVELOPMENT AND MAINTENANCE

A. PHYSICAL DEVELOPMENT

1. Batchtown Division

There was no physical development. The service road sides were mowed one time and the road itself was graded.

2. Calhoun Division

A great many small construction, repair, and maintenance jobs were completed.

A portion of the barn at headquarters was remodeled and converted to a shop area to replace the haphazard shop operation in the equipment storage building at Swan Lake.

Several minor Soil and Moisture projects were done in Calhoun fields.

3. Gilbert Lake Division

A short section of the Illinois River bank was rip-rapped to prevent washout damage to the adjacent main water control dike.

Ditches were excavated in Fields PM-1 and PM-3 to tie desilting basins constructed last year into the water sheds for which they were constructed. Old ditches were closed with spoil, shaped, and incorporated into the fields.

B. PLANTINGS

1. Aquatics and Marsh Plants

Nothing to report.

2. Trees and Shrubs

Nothing to report.

APRIL 1973

3. Upland Herbaceous Plants

Nothing to report.

4. Cultivated CropsBatchtown Division

Eight cooperators planted 96 acres of soybeans, 86 acres of corn, 41 acres of buckwheat, 7 acres of millet, and 10 acres of wheat. Drought conditions in July and August seriously reduced all yields.

Calhoun Division

Ten cooperators planted 9 acres of wheat for harvest, 352 acres of wheat browse, 113 acres of buckwheat, 298 acres of corn, 528 acres of soybeans, and 78 acres were plowed but not planted.

These acres also showed a reduced yield owing to drought conditions during the summer. All wheat browse was seeded aerially into standing green soybeans or corn in September. This operation is attracting some attention from private farming interests. Somewhat over 150 acres were seeded off refuge at the same time as the refuge operation. This was 150 acres that was not fall plowed.

Gilbert Lake Division

Two cooperators planted 74 acres of corn, 87 acres of wheat browse, 10 acres of wheat for harvest, 17 acres of buckwheat, and 87 acres of soybeans. Here too, aerial seeding in beans and corn was used to provide browse. Corn seeded to wheat on this division had been treated with Atrazine. This area sprouted nicely and reached a length of about 5 inches then it simply shriveled and died. This was not unexpected on our part, but we were assured by our Atrazine suppliers that it would not happen. Against our advice, an area off refuge which had been treated with Atrazine was seeded to wheat. Here too, the wheat sprouted beautifully, then failed.

On all three divisions we were plagued by a very wet fall with little or no solid freezing. Much of our crop had not been harvested until mid-January 1973. Because of this delayed harvest of soybeans in which wheat had been seeded, cooperators lost soybeans to geese. These fields were a lovely green from the air and the geese didn't know that they were not supposed to eat \$6.00 beans.

C. COLLECTIONS AND RECEIPTS1. Seeds and Propagules

Nothing to report.

2. Specimens

Several specimens collected (found dead in good condition) during the year were turned over to the Illinois State Museum in Springfield, Illinois. Among these were: 1 pintail, 1 mallard, 1 screech owl, 1 hairy woodpecker, 1 common gallinule, and 1 brown creeper. Also supplied by trapping were two golden house mice (loss of melanin). Several specimens scheduled for the same institution were lost when a lightning strike burned out the manager's refrigerator in June.

D. CONTROL OF VEGETATION

Cooperating farmers used only approved herbicides and insecticides on croplands to control weeds and insect pests. The refuge staff used Dalapon for control of Johnson grass on the Gilbert Lake overlook roadsides and in Fields AU-26-16 and PM-3. Success with Dalapon (8 pounds/acre) was only partial.

E. PLANNED BURNING

Nothing to report.

F. FIRES

No accidental fires occurred.

IV. RESOURCE MANAGEMENT

A. GRAZING

Nothing to report.

B. HAYING

Nothing to report.

C. FUR HARVEST

Two recreational trapping permits were issued. No take reports are required. Verbal information from the two individuals indicated fewer than two dozen muskrats were taken in 1972. Permits were issued to every applicant at no cost.

D. TIMBER REMOVAL

Nothing to report.

E. COMMERCIAL FISHING

No permits were issued. That portion of Swan Lake which was open to commercial gear produced only fair catches of carp, buffalo and catfish.

F. OTHER USES

Nothing to report.

BRUSSELS DISTRICT

MARK TWAIN NWR

V. FIELD INVESTIGATION OR APPLIED RESEARCH

NOTHING TO REPORT.

APRIL 1973

VI. PUBLIC RELATIONSA. RECREATIONAL USESBatchtown Division

Warmwater fishing was the greatest recreational use of this division. This activity was engaged in by an estimated 7,500 people for a total of 22,300 hours. There were approximately 300 hunting visits totaling 900 activity hours. Gathering of pecans and mushrooms provided 155 visitors with about 300 hours of recreation. Other uses were almost negligible.

Calhoun Division

Fishing was also the greatest single recreational use on this division. About 7,300 visitors fished for 21,500 hours. This activity ranged from pole and line through commercial to gigs, bows, and hand fishing. Wildlife observation was second in popularity and 900 people spent 2,200 hours mostly looking at birds. Hunting of squirrels, rabbits, raccoons, and quail accounted for 1,100 hours of activity by 365 hunters. Almost 450 people sought mushrooms in the spring and pecans in the fall. Several people took pictures and a few trapped animals.

Gilbert Lake Division

On this division there were more wildlife observers than fishermen, about 4,000 people were estimated to have observed ducks, and geese, mostly from the overlook road and from their autos. Probably 25 per cent of these observers did more than sit in their car. Fishing was indulged in by fewer people - approximately 1,200, but for far more hours - 3,400 as compared to 2,900 for observers. There were about 175 hunters of raccoons and squirrels, and 150 gatherers of pecans and mushrooms. Other activities included a few hikers and photographers.

In addition to the above activities 1,700 students used the area during the year for an educational experience. Whether or not this could be called environmental education is a moot question.

B. REFUGE VISITORS

Bureau visitors were few. Assistant Supervisor Gritman visited the refuge in March and David Smith of Realty Division was down twice during the year.

Personnel of the Division of Parks and Memorials and Division of Wildlife Resources, and Division of Enforcement, Illinois Department of Conservation were frequent visitors.

Agents Paul Babuckna and Dale Schuller, F.B.I., and State Troopers Jim Franke and Rutger Peters were by, both on investigation and courtesy visits.

In the course of the year many visits were made by Soil Conservation Service District Conservation Officer Russell Sass and Technician Kraut. Other Soil Conservation Service personnel included George Threlkeld, District Conservation, Jersey County, and Jim Steinkamp, Soil Scientist.

Matt Horn and Paul Cornelius, U.S.D.A. Crop Reporting Service, visited on several occasions.

C. REFUGE PARTICIPATION

Several programs were given, meetings attended, and cooperative activities carried out. Among these were:

January

Cooperated in annual mid-winter inventory.

Gave slide talk to Community Unit 100 East Junior High School, Jerseyville, Illinois.

Attended State Chapter meeting The Wildlife Society, Carbondale, Illinois.

Met with members of Migratory Waterfowl Hunters, Inc. regarding their program for the year.

February

Assisted with Audubon One day Eagle Count on Illinois and Mississippi Rivers and their backwaters.

Assisted Southern Illinois University student with information on bald eagle report.

BRUSSELS DISTRICT

MARK TWAIN NWR

March

Supplied slides (refuge and personal) to Pere Marquette Park Naturalist, Susan Wright, for use in slide talk.
Met with Corps of Engineers regarding logging operations in County.

April

Conducted tour of Gilbert Lake for District Meeting of Soil Conservation Society of America.

May

Attended annual meeting of the Illinois Audubon Society, Springfield, Illinois.

June

Conducted dove census route in Greene County, Illinois.
Assisted in body recovery and investigation of drowning at Royal Landing.
Met with Corps of Engineers personnel regarding general management of areas, mostly a courtesy visit.
Met with personnel of the West Central Illinois Law Enforcement Commission regarding enforcement problems in the County in general, and on Federal lands in particular.

July

Assisted Coast Guard with investigation of a lube oil spill on the Illinois River.
Attended Agronomy Day at Southern Illinois University Experimental Station, Belleville, Illinois.
Assisted in dragging operations, body recovery, and investigation of a drowning at Royal Landing.

August

Met with members of St. Louis Audubon Society for a discussion of observation tower on Swan Lake, Calhoun Division.
Assisted Army personnel with bus breakdown problem.
Assisted Sheriff and F.B.I. with investigation of burglary of equipment building.
Met with personnel of Illinois E.P.A. regarding trash dumping in County.
Gave slide talk to congregation of St. Louis Unitarian Church.

APRIL 1973

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BRUSSELS DISTRICT

MARK TWAIN NWR

September

Conducted tour of Gilbert Lake area for District Boards, Soil Conservation Service of Calhoun and Jersey Counties.
Attended Fall Campout and meeting of Illinois Audubon Society, Carbondale, Illinois.

October

Attended annual meeting of Missouri Audubon Society, Lake of the Ozarks, Missouri.
Met with Dr. S. Morhardt of Harland, Bartholemew and Associates regarding ecological impact of the proposed new Lock and Dam 26.

November

Met with personnel of the Foundation for Illinois Archeology for an insite evaluation of archeological discoveries at Gilbert Lake.
Gave out-of-door (and off refuge) lecture on the role of the Federal Government in Migratory Bird Management to Wildlife Management classes, Principia College.
Gave slide talk to Unitarian Ministers Alliance at Pere Marquette State Park.
Conducted tour of Gilbert Lake area for same ministerial alliance as a result of above slide talk,

December

Gave slide talk to Brussels Grade School, Brussels, Illinois.
Attended Midwest Wildlife Conference, Des Moines, Iowa.
Assisted Illinois Audubon Society with Audubon Christmas Count.
(Part or all of divisions included in Pere Marquette Count).
Cooperated in mid-December goose survey.

Throughout the year many tours were conducted for school students because few teachers are yet prepared to take environmental education directly to their students.

Several press releases were made, mostly verbal.

D. HUNTING

Resident game hunting, i.e.: quail, rabbit, squirrel, and raccoon was comparable to adjoining private and state operated areas.

APRIL 1973

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Waterfowl hunting on areas operated by Illinois Department of Conservation was disappointing for the most part. There were no big concentrations of either ducks or geese. Many wet, unharvested fields scattered birds, but provided little hunting opportunity. The Corps of Engineers, due to waterflow on the Mississippi, drew down Pool 25, dewatering the Batchtown Shooting Area, and stopped all hunting for about two weeks. The goose flocks stayed unusually close to the refuge and few were taken.

E. VIOLATIONS

No violators were apprehended. Our enforcement efforts were more preventive than punitive in nature.

In August a burglary occurred in the equipment building and bone-yard. Over \$2,000.00 worth of tools and supplies were stolen. Entry to the building was gained by breaking a hole in one fiberglass door. Stolen items were hauled off by boat. F.B.I. agents investigated the crime but no apprehensions have been made to date.

F. SAFETY

There were no reportable accidents. The staff attended all Safety meetings held during the year. Remodeling done in the barn to provide a better shop was done with an eye to improving the safety of shop operations generally. It is not ideal, but is much better than the previous shop unit in the equipment building.

BRUSSELS DISTRICT

MARK TWAIN NWR

VII. OTHER ITEMS

A. ITEMS OF INTEREST

Nothing to report.

B. PHOTOGRAPHS

Appended.

APRIL 1973



At Gilbert Lake a ditch was excavated to.....

568-0A WDV



.....tie the watershed drainage into desilting
basins built last year.

568, 18A WDV



Fifty years protection of this marsh at the
east end of Gilbert is estimated as a result
of basin construction.

562-15 WDV

The lead poisoning story.....



going.....

547-13A WDV



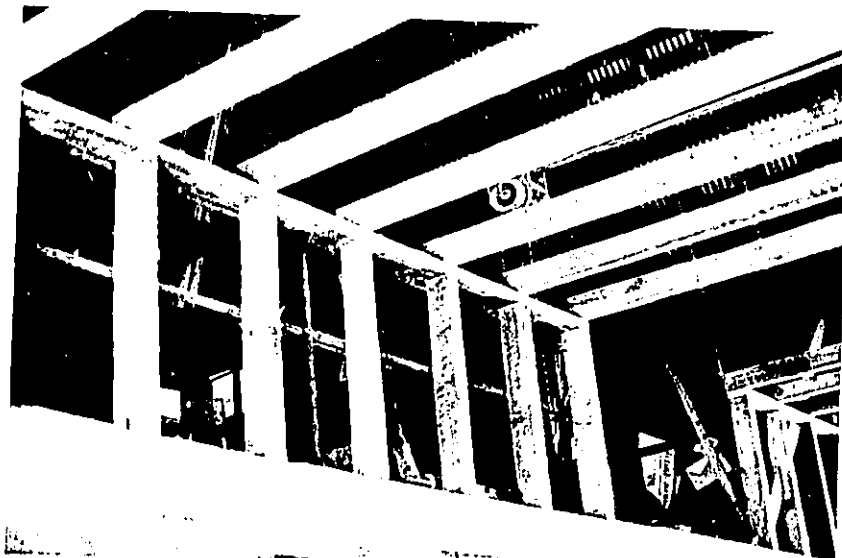
going.....

547-12A WDV



and gone.

547-15A WDV



Barn shop remodeling - studs, plates, and rafters in place.

566-16A WDV



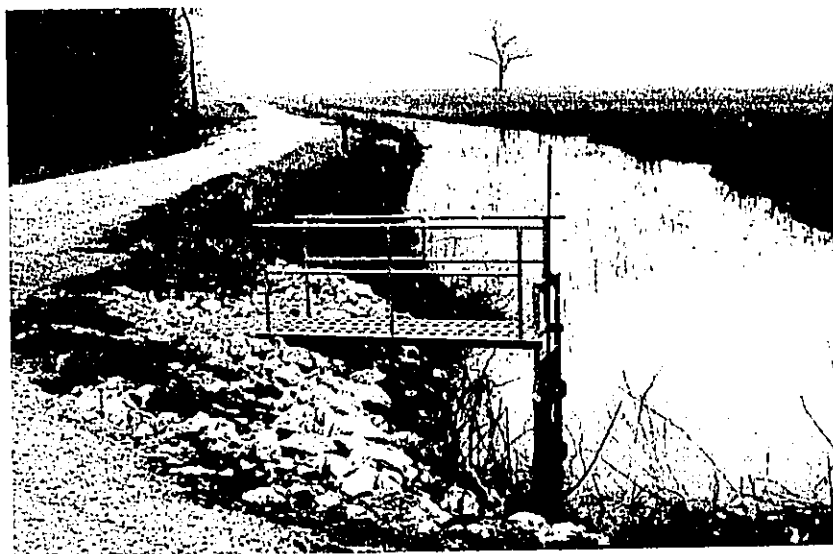
Approaching completion.

569-3A WDV



Since the Gilbert Lake dike was constructed in 1963-64, the Illinois River has moved too close - additional rip rap was put in to protect the dike.

563-14A WDV



Walkways were constructed and installed at the water control gates on Moist Soil Units 1 and 2.

553-9A WDV



The blue-snow goose flock used refuge fields intensively.

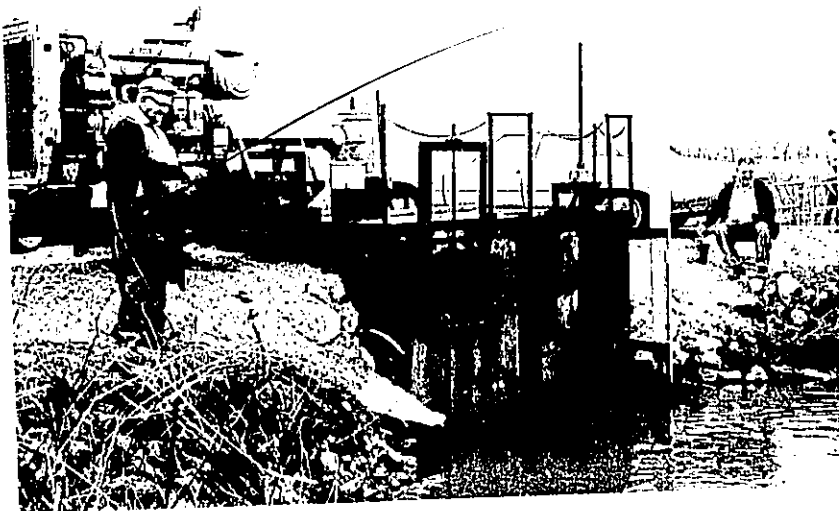
570-7A WDV



We had our usual wintering bald eagles.

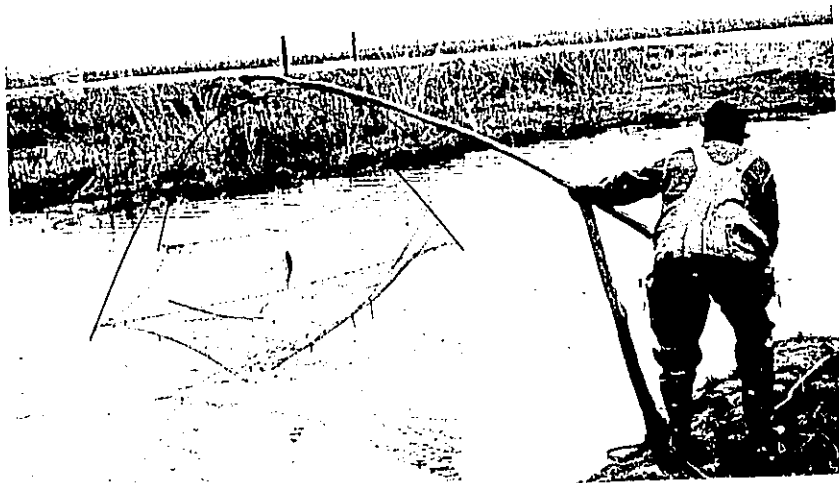
570-1A WDV

Fishing has many formats on this refuge.....



Pole and line.....

556-5 WDV



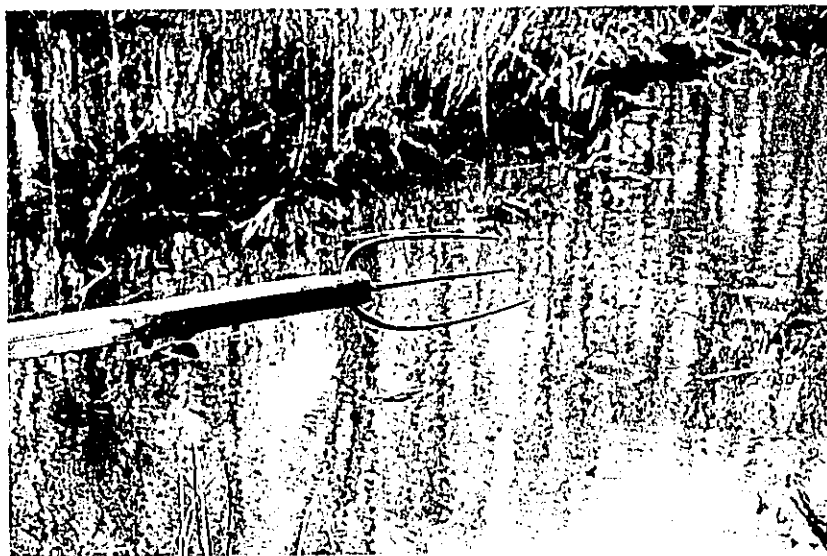
.....dip net.....

556-18 WDV



.....and gig.

556-6 WDV



This one homemade.

556-8 WDV



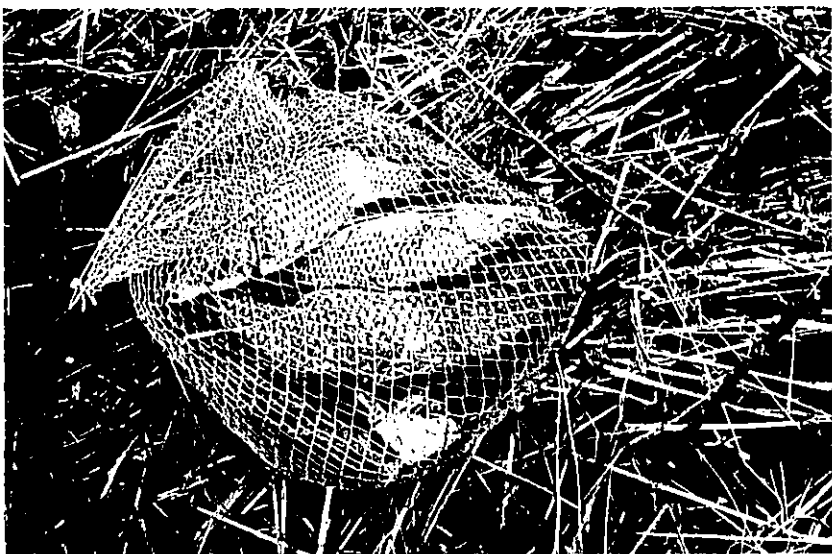
.....still another flood water tool.....

556-14 WDV



.....and some carry it all
at once.

559-5 WDV



The end result is a sack full of carp - and a happy fisherman.


556-7 WDV

NARRATIVE REPORT - 1972

MARK TWAIN NWR

SIGNATURE PAGE

Submitted By:


(Signature)

Refuge Manager
(Title)

DATE: _____

APPROVED, REGIONAL OFFICE:

DATE: 6/15/73



(Signature)

~~Regional Refuge Supervisor~~

~~[Regl. Land Mgmt. Supvr.]~~

APRIL 1973

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

PAGE 1

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge MARK TWAIN NWR For 12-month period ending August 31, 1972
Reported by Leslie F. Beaty Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acreage			
TOTAL MARK TWAIN	Crops	6297	Ducks	1375	3280
	Upland	9996	Geese		
	Marsh	1951	Swans		
	Water	4926	Coots		
	Total	23,170	Total	1375	3280
Louisa Division	Crops	1026	Ducks	100	100
	Upland	1047	Geese		
	Marsh	51	Swans		
	Water	486	Coots		
	Total	2610	Total	100	100
B. Timber Division	Crops	27	Ducks	120	100
	Upland	1234	Geese		
	Marsh	----	Swans		
	Water	497	Coots		
	Total	1758	Total	120	100
Keithsburg Division	Crops	----	Ducks	120	120
	Upland	1010	Geese		
	Marsh	222	Swans		
	Water	178	Coots		
	Total	1410	Total	120	120
Gardner Division	Crops	767	Ducks	300	750
	Upland	3396	Geese		
	Marsh	70	Swans		
	Water	598	Coots		
	Total	4831	Total	300	750
Delair Division	Crops	643	Ducks	60	75
	Upland	289	Geese		
	Marsh	232	Swans		
	Water	130	Coots		
	Total	1294	Total	60	75
Cannon Division	Crops	2203	Ducks	105	75
	Upland	953	Geese		
	Marsh	490	Swans		
	Water	100	Coots		
	Total	3746	Total	105	75

(over)

3-17500
Form NR-1B
(Rev. Nov. 1957)

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE

PAGE 2

WATERFOWL UTILIZATION OF REFUGE HABITAT

Refuge MARK TWAIN NWR For 12-month period ending August 31, 1972

Reported by Leslie F. Beaty Title Refuge Manager

(1) Area or Unit Designation	(2) Habitat		(3) Use-days	(4) Breeding Population	(5) Production
	Type	Acres			
Batchtown Division	Crops	328	Ducks	250	1000
	Upland	981	Geese		
	Marsh	530	Swans		
	Water	503	Coots		
	Total	2342	Total	250	1000
Calhoun Division	Crops	1120	Ducks	180	620
	Upland	821	Geese		
	Marsh	213	Swans		
	Water	2369	Coots		
	Total	4523	Total	180	620
Cort Lake Division	Crops	183	Ducks	140	440
	Upland	265	Geese		
	Marsh	143	Swans		
	Water	65	Coots		
	Total	656	Total	140	440
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		
	Crops		Ducks		
	Upland		Geese		
	Marsh		Swans		
	Water		Coots		
	Total		Total		

(over)

3-1750
Form 1-1C
(Sept. 1960)

Waterfowl Hunter Kill Survey

Refuge MARK TWAIN (Turkey and Otter Islands - Louisa Division)

Year 1967

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est.No. Hunters	(9) Est. Kill
6 (Split season Oct.7-12; Oct.21- Dec. 3)	4 (No Ducks)	5,145	Mallard	*	*	*	*	*
			Black Duck	2,680	100	2,780	1,817	3,114
			Gadwall	25	---	25		
			Pintail	2	---	2		
			Green-winged Teal	15	---	15		
			Widgeon	55	5	60		
			Wood Duck	5	---	5		
			Lesser Scaup	20	10	30		
			Ruddy Duck	55	5	60		
			Shoveler	5	---	5		
				55	15	70		
			Coot					
				50	10	60		
			Canada Geese					
				1	1	2		
			TOTALS	2,968	146	3,114		
			* Poorly based estimates, in fact, little more than guesses!					
			(over)					

3-1750
Form F-1C
(Sept. 1960)

Waterfowl Hunter Kill Survey

Refuge MARK TWAIN (Keithsburg, Gardner, Delair, Cannon, Batchtown, Calhoun
and Gilbert Lake Divisions)

Year 1967

(1) Weeks of Hunting	(2) No. Hunters Checked	(3) Hunter Hours	(4) Waterfowl Species and Nos. of Each Bagged	(5) Total Bagged	(6) Crippling Loss	(7) Total Kill	(8) Est.No. Hunters	Est. K
			ALL THE ABOVE DIVISIONS OF MARK TWAIN REFUGE ARE CLOSED TO WATERFOWL HUNTING, THEREFORE - NOTHING TO REPORT.					

(over)

3-1755
Form NR-5

DISEASE

Refuge MARK TWAIN (Gilbert Lake Division)

Year 19 72

Botulism

Lead Poisoning or other Disease

Period of outbreak NONE

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks Nothing to report.

Kind of disease Lead Poisoning

Species affected Mallard, Black Duck and Canada Geese

Number Affected	Actual Count	Estimated
Species		
Mallard	_____	<u>700</u>
Black Duck	_____	<u>50</u>
Canada Geese	_____	<u>100</u>

Number Recovered Unknown

Number lost About 1,000 total.

Source of infection Public shooting areas.

Water conditions Die-off occurred during heavy icing, poisoning took place after end of hunting season when waters of shooting areas were open.

Food conditions Cultivated crops were readily available to birds on refuge. Flooded natural foods were highly attractive to waterfowl on shooting areas - but were depleted on refuge.

Remarks _____

3.1755
Form NR-5

DISEASE

Refuge MARK TWAIN (Louisa, Big Timber, Keithsburg, Year 19 72
Gardner, Delair, Cannon, Batchtown, and Calhoun Divisions

Botulism

Lead Poisoning or other Disease

Period of outbreak NONE

Period of heaviest losses _____

Losses:

	Actual Count	Estimated
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Number Hospitalized	No. Recovered	% Recovered
(a) Waterfowl	_____	_____
(b) Shorebirds	_____	_____
(c) Other	_____	_____

Areas affected (location and approximate acreage) _____

Water conditions (average depth of water in sickness areas, reflooding of exposed flats, etc.) _____

Condition of vegetation and invertebrate life _____

Remarks NOTHING TO REPORT.

Kind of disease NONE

Species affected _____

Number Affected Species	Actual Count	Estimated
_____	_____	_____
_____	_____	_____
_____	_____	_____

Number Recovered _____

Number lost _____

Source of infection _____

Water conditions _____

Food conditions _____

Remarks NOTHING TO REPORT.

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge MARK TWAIN (Delair Division)

Year 19 72

Collections and Receipts (Seeds, rootstocks, trees, shrubs)							Plantings (Marsh - Aquatic - Upland)					
Species	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival
K-31 Fescue							Butcher Water Control Repair on Sny.			15 pounds seed	April	Good

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic _____
Hedgerows, cover patches _____
Food strips, food patches _____
Forest plantings _____

Remarks:

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTION RECEIPTS, AND PLANTINGS

Refuge MARK TWAIN (Cannon Division)

(1)

Year 19 72

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)					
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival
Elsberry Autumn Olive		R		Plant Material Center		250 Trees	Grass within Section 17	1 tree/ each 5'	1/4 mile (1 row)	250 trees	5/10	20%
K-31 Fescue						450 Lbs.	Repair spots on Ext. levee ('69 break-40#) ('69 Breech-15#) (Pumphouse-15#)	Undetermined		70# seed	April	Est. Good
Smartweed						10 lbs.	New Headquarters pond.		200 yards shoreline		June	Unknown
Ryegrass						200 Lbs.	Stripping area around head- quarters Pond			100# seed.	June	Poor

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Remarks:

Total acreage planted:

Marsh and aquatic

Hedgerows, cover patches

Food strips, food patches

Forest plantings

3-1757
Form NR-7
(Rev. June 1960)

NONAGRICULTURAL COLLECTIONS, RECEIPTS, AND PLANTINGS (1)

Refuge MARK TWAIN (Louisa, Big Timber, Keithsburg, Gardner, Batchtown, Calhoun and Gilbert Lake.) Year 1972

Species	Collections and Receipts (Seeds, rootstocks, trees, shrubs)						Plantings (Marsh - Aquatic - Upland)					
	Amount (Lbs., bus., etc.)	(2) C or R	Date	Method or Source	Cost	(3) Total Amount on Hand	Location of Area Planted	Rate of Seeding or Planting	Amount Planted (Acres or Yards of Shoreline)	Amount and Nature of Propagules	Date	Survival
NONE							NONE					
No collections or receipts or plantings were made on the above divisions of Mark Twain Refuge in 1972.												

- (1) Report agronomic farm crops on Form NR-8
(2) C = Collections and R = Receipts
(3) Use "S" to denote surplus

Total acreage planted:

Marsh and aquatic -0-
Hedgerows, cover patches -0-
Food strips, food patches -0-
Forest plantings -0-

Remarks:

3-1758
Form W-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Louisa Division) County Louisa State Iowa

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./Tons	Unharvested Acres	Bu./Tons			
Corn	163 ^{1/}	16,300 ^{2/}	0	0	19	1900 ^{2/}	182	Winter Wheat	49
Soybeans	196	4,900 ^{3/}	0	0	0	0	196	Alfalfa-Bromegrass	55
Milo	0	0	0	0	51	0	51		
Buckwheat	0	0	0	0	58	0	58		
Japanese Millet	0	0	0	0	25	0	25		
								Fallow Ag. Land.	384

- 1/ Approximately 25 acres not harvested due to wet soil conditions.
2/ Estimated corn production averaged 100 bushels/acre.
3/ Estimated soybean production averaged 25 bushels/acre.

No. of Permittees: Agricultural Operations 3 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild				2. Acreage Cultivated as Service Operation				

1,000 (Inc. fallow gro.)

3-1753
Form 2-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Big Timber Division) County Louisa State Iowa

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water-fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./Tons	Unharvested Acres	Bu./Tons			
Corn	0	0	0	0	0	0	15 1/2		
1/2 Corn flooded out before maturation - entire crop lost.									
								Fallow Ag. Land.	10.7

No. of Permittees: Agricultural Operations 1 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				
Hay - Wild				2. Acreage Cultivated as Service Operation				
								25.7

3-1758
Form W-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Keithsburg Division) County Mercer State Illinois

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./Tons	Unharvested Acres	Bu./Tons			
NONE									
								Fallow Ag. Land.	

No. of Permittees: Agricultural Operations Haying Operations Grazing Operations

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle			
				2. Other			
				1. Total Refuge Acreage Under Cultivation			
Hay - Wild				2. Acreage Cultivated as Service Operation			

3-1758
Form R-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Gardner Division) County ADAMS State ILLINOIS

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./Tons	Unharvested Acres	Bu./Tons			
Corn	430	28,500 b	0	0	127	8,382 bu.	557	Winter Wheat	15
Milo	0	0	0	0	45	3,150 bu.	45		
Soybeans	130	4,250 b	0	0	0	0	130		
								Fallow Ag. Land. Flooded during summer	20

No. of Permittees: Agricultural Operations 2 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				767
Hay - Wild				2. Acreage Cultivated as Service Operation				0

3-1758
Form W-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Batchtown Division) County CALHOUN State ILLINOIS

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Cr Type and Kind	
	Acres	Bu./Tons	Harvested		Unharvested				
			Acres	Bu./ Tons	Acres	Bu. /Tons			
Hybrid Corn	59	2,950 bu	2	100	26	1,500 bu.	86	Winter Wheat	86
Soybeans	96	960 bu.	0	0	0	0	96		96
Wheat	10	250 bu.	0	0	0	0	--		10
Buckwheat	0	0	0	0	41	1,400 bu.	--		41
Millet	0	0	0	0	7	200 bu.	--		7
								Fallow Ag. Land. Plowed but not planted.	11

No. of Permittees: Agricultural Operations 8 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				251
Hay - Wild				2. Acreage Cultivated as Service Operation				None

3-1758
Form W-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Calhoun Division) County CALHOUN State ILLINOIS

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./Tons	Unharvested Acres	Bu./Tons			
Wheat	9	310 bu.	0	0	0	0	9	Wheat Browse-352	9
Buckwheat	0	0	0	0	113	3,390 bu.	113		113
Soybeans	528	19,536 bu.	0	0	0	0	528		528
Hybrid Corn	204	14,280 bu.	0	0	94	6,580 bu.	298		298
								Fallow Ag. Land. Plowed but not planted.	78

No. of Permittees: Agricultural Operations 10 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				1,026
Hay - Wild				2. Acreage Cultivated as Service Operation				0

2-17-56
Form W-8
(Rev. Jan. 1956)

Fish and Wildlife Service Branch of Wildlife Refuges

CULTIVATED CROPS - HAYING - GRAZING

Refuge MARK TWAIN (Gilbert Lake Division) County JERSEY State ILLINOIS

Cultivated Crops Grown	Permittee's Share Harvested		Government's Share or Return				Total Acreage Planted	Green Manure, Cover and Water- fowl Browsing Crops Type and Kind	Total Acreage
	Acres	Bu./Tons	Harvested Acres	Bu./ Tons	Unharvested Acres	Bu. /Tons			
Hybrid Corn	50	6,000 bu	0	0	24	2,640 bu.	74		74
Soybeans	87	3,045 bu	0	0	0	0	87		87
Wheat	7	189 bu	0	0	3	81 bu.	10	Wheat Browse-87	10
Buckwheat	0	0	0	0	17	680 bu.	17		17
								Fallow Ag. Land.	0

No. of Permittees: Agricultural Operations 2 Haying Operations 0 Grazing Operations 0

Hay - Improved (Specify Kind)	Tons Harvested	Acres	Cash Revenue	Grazing	Number Animals	AUM'S	Cash Revenue	ACREAGE
None				1. Cattle	None			
				2. Other	None			
				1. Total Refuge Acreage Under Cultivation				188
Hay - Wild				2. Acreage Cultivated as Service Operation				-6-

9-1570
(h/5h)

REFUGE GRAIN REPORT

Refuge MARK TWAIN

Months of JANUARY through DECEMBER

(1) VARIETY*	(2) ON HAND BEGINNING OF PERIOD	(3) RECEIVED DURING PERIOD	(4) TOTAL	(5) GRAIN DISPOSED OF				(6) ON HAND END OF PERIOD	(7) PROPOSED OR SUITABLE USE*		
				Transferred	Seeded	Fed	Total		Seed	Feed	Other
Hybrid Corn (Ear)	0	250 bu.	250	0	0	0	0	250 bu.	0	250 bu.	0
Hybrid Corn (Shelled)	0	200 bu.	200	0	0	0	0	200 bu.	0	200 bu.	0

(8) Indicate shipping or collection points _____

(9) Grain is stored at Calhoun Division headquarters.

(10) Remarks Stored for use as bait in possible banding operations.

* See instructions on back.

3-1761

Form NR-11

(2/46)

TIMBER REMOVAL

Refuge MARK TWAIN (Louisa, Big Timber, Keithsburg year 1954/72
Gardner, Delair, Cannon, Batchtown, Calhoun and Gilbert Lake)

Permittee	Permit No.	Unit or Location	Acreage	No. of Units Expressed in B. F., ties, etc.	Rate of Charge	Total Income	Reservations and/or Diameter Limits	Species C
NOTHING TO REPORT. NONE REMOVED FROM ANY OF THE ABOVE DIVISIONS OF MARK TWAIN REFUGE IN 1972.								

Total acreage cut over.....

Total income.....

No. of units removed B. F.

Method of slash disposal.....

Cords.....

Ties.....